zenith

# SERVICE MANUAL

| | |
|---|---|
| Product Type: | LCD Directview |
| Chassis: | MF02HA |
| Manual Series: | PV155 |
| Model Line: | F |
| Product Year: | 2003 |

Model Series:

L30W36

REVISED EDITION
Training material added

CONTENTS




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201 James Record Road
Huntsville, Alabama 35824-1513





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# PRODUCT SAFETY SERVICING GUIDELINES FOR AUDIO-VIDEO PRODUCTS

**IMPORTANT SAFETY NOTICE**

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent shock and fire hazard. These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by Zenith Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

**CAUTION:** Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury. Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

**FIRE AND SHOCK HAZARD**

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following.

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items transported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

**TIPS ON PROPER INSTALLATION**

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using a cart or stand that has not been listed by Underwriters Laboratories, Inc. for use with its specific model of television receiver or generically approved for use with TVs of the same or larger screen size.
8. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

**ELECTROSTATICALLY SENSITIVE DEVICES**

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on the body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as an ESD mat, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material.)

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

Caution: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise, seemingly harmless motion, such as the brushing together of your clothing or the lifting of your foot from a carpeted floor, can generate static electricity sufficient to damage an ES device.)

**REGULATORY INFORMATION**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.

The responsible party for this device's compliance is:
Zenith Electronics Corporation
201 James Record Road
Huntsville, AL 35824, USA
Digital TV Hotline: 1-800-243-0000

# TABLE OF CONTENTS

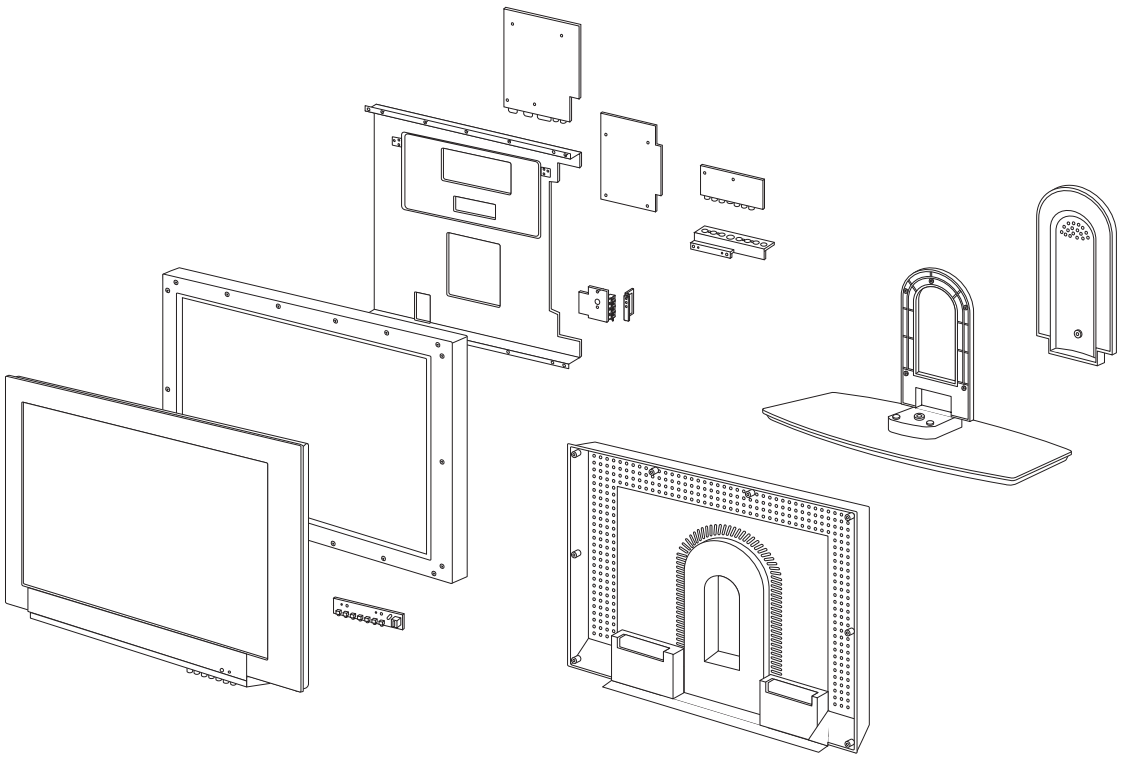
## OVERVIEW

**INTRODUCTION**

This manual covers the 30" LG and Zenith LCDs. They feature a 30" viewable area in a widescreen format. They do not have a built in tuner but do have two RGB inputs, one VGA and one DVI-I. The "-I" of "DVI-I" means they support both digital and analog, so a regular VGA connection can be input to this connection using a DVI to VGA adapter (not supplied). The reason for two adapters is to allow a computer and a set-top box to be connected at the same time. It is recommended to connect devices like a computer using the DVI connection due to the high resolution and to avoid any interference. This model also features regular TV connections to allow other components such as VCRs and DVDs to be connected.

The internal layout is slightly different than smaller LCD TVs. This LCD has more fluorescent lamps (16) and a built-in power supply that earlier smaller models didn't have. This model features a service menu with advanced settings that can be accessed using an NEC service remote. Some new functions are available to the operator. These include; Color Temperature, Screen Saver, Picture Format, Zoom, Picture Position, and a VCR jitter removal feature.

This LCD is module level repair only. This device is more delicate than a regular TV and extra care should be taken when working on it. The screen is plastic instead of glass and it's circuits are static sensitive. Most failures will be related to a lamp inverter or a lamp, which will likely be reported by the consumer as the screen suddenly becoming darker or flickering. There are four lamp assemblies per inverter (2 lamps per assembly), so if an inverter is defective it will affect four lamp assemblies at once (half the screen) versus a lamp related problem that will affect only one lamp at a time.



**SPECIFICATIONS**

DISPLAY

Screen: 30" (30"VIS) WXGA Active Matrix TFT Color LCD, Digital Progressive 25.3" x 15.2" (643mm x 386mm)

Aspect Ratio: 16:9
Pixel Clock: 65Mhz
Contrast Ratio: 450:1
Response Time: 22ms (Typical), 25ms (Max.)
Peak Brightness: 450 cd/m2
Fall & Rise Time: 12ms (Typical)
Native Display Resolution: 1280 x 768 (WXGA)
Cell Pitch (HxV): 0.5025mm x 0.1675mm x RGB
Backlighting: 16 CCFL Lamps Hf: 31.5~80KHz Vf: 56~120Hz
Displayable Colors: 16.77 Million (24 Bit)
Surface Treatment: Hard Coating 3H, Anti-Glare
Viewing Angle: 170° (Up/Down)(Left/Right)
Electronic Interface: LVDS

INPUT SOURCE RANGES

1) Input Paths: Composite, S-Video, Component (480i, 480p, 720p, 1080i), RGB 1, RGB 2, RS-232C.

2) Video System Recognition: NTSC M, NTSC 4.43, PAL, PAL M, PAL N, PAL 4.43, SECAM

3) RGB 1 Mode Compatibility: Up to SXGA 75Hz

4) RGB 2 Mode Compatibility: Up to SXGA 60Hz

VIDEO CONTROLS

RGB Video Controls include Contrast, Brightness, Color Red, Color Green, Color Blue, User Setting Reset. Clock, Phase, Auto Tracking (Automatic Clock & Phase Optimization). AV Video Controls (AV1, AV2, S-Video, Component 1, Component 2) include Contrast, Brightness, Color Level(Saturation), Tint(Hue), Sharpness, User Setting Reset.

POWER

This TV accepts power input of 100V~240V at 50/60HZ. Power consumption is 170W Max while on and less than 8W in standby mode.

DIMENSIONS

Monitor Only (WxHxD): 29.9" x 19.4" x 4.1" (759mm x 492mm x 103mm)

Monitor & Base: 29.9" x 21.1" x 7.1" (759mm x 546mm x 180mm)

Shipping Dimensions (WxHxD): 32.9" x 26.2" x 14.4" (836mm x 665mm x 366mm)

Weight (with base): 40.5 lbs (18.4 kg)

Shipping Weight: 51.9 lbs (23.55 kg)

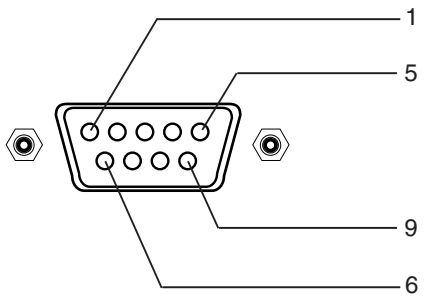
## EXTERNAL CONTROL

### CONNECTION

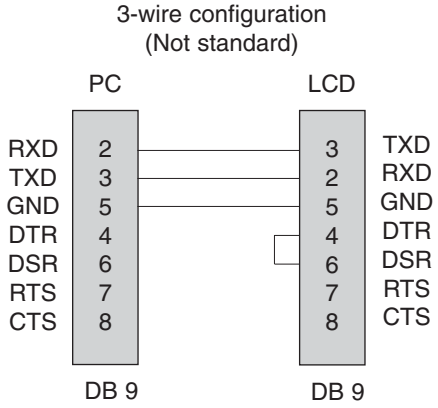
Connect the RS-232C (serial connector) input jack to the monitor's RS-232C input jack (RS-232C connection cables are not supplied with the Monitor). Press the menu button and then use the the up/down buttons to select the special menu. Press the volume up (right) button. Use the up/down buttons to select Set ID and then press the volume up (right) button. Use the volume buttons to choose the desired monitor ID number and then press the enter button. The Set ID adjustment range is 1-99.

**Type of Connector: D-Sub 9-pin Male**

| No. | Pin name |
|---|---|
| 1 | No connection |
| 2 | RXD (Receive data) |
| 3 | TXD (Transmit data) |
| 4 | DTR (DTE side ready) |
| 5 | GND |
| 6 | DSR (DCE side ready) |
| 7 | RTS (Ready to send) |
| 8 | CTS (Clear to send) |
| 9 | No Connection |




### CONFIGURATIONS




**Communication Parameters**

- Baud rate : 115200bps (UART)
- Data length : 8 bits
- Parity : None
- Stop bit : 1 bit
- Communication code : ASCII code

* Use the Crossed (reverse) cable.

**Command Reference List**

| NAME | Command | Command | DATA |
|---|---|---|---|
| 01. Power | k | a | 0 ~ 1 |
| 02. Input Select | k | b | 0 ~ 4 |
| 03. Aspect Ratio | k | c | 0 ~ 2 |
| 04. Screen Mute | k | d | 0 ~ 1 |
| 05. Volume Mute | k | e | 0 ~ 1 |
| 06. Volume Control | k | f | 0 ~ 64 |
| 07. Contrast | k | g | 0 ~ 64 |
| 08. Brightness | k | h | 0 ~ 64 |
| 09. Color | k | i | 0 ~ 64 |
| 10. Tint | k | j | 0 ~ 64 |
| 11. Sharpness | k | k | 0 ~ 64 |
| 12. OSD select | k | l | 0 ~ 1 |
| 13. remote control lock mode | k | m | 0 ~ 1 |
| 14. PIP select | k | n | 0 ~ 3 |
| 15. PIP size | k | o | 0 ~ 1 |
| 16. PIP position | k | q | 0 ~ 3 |
| 17. Treble | k | r | 0 ~ 64 |
| 18. Bass | k | s | 0 ~ 64 |
| 19. Balance | k | t | 0 ~ 64 |
| 20. Color temperature | k | u | 0 ~ 3 |
| 21. R adjust | k | v | 0 ~ 64 |
| 22. G adjust | k | w | 0 ~ 64 |
| 23. B adjust | k | $ | 0 ~ 64 |
| 24. Sub picture input select | k | y | 0 ~ 2 |

TRANSMISSION PROTOCOL

*Transmission*

| [Command1][Command2][ ][Set ID][ ][Data][Cr] |
|---|

* [Command1] : To classify factory-adjustment mode or user-adjustment mode.
* [Command2] : To control LCD set.
* [Set ID] : You can adjust Set ID to choose desired monitor ID number in Special menu. Adjustment range is 1 ~ 99. When selecting Set ID '0', every connected LCD set is controlled. select '0', factory adjustment. (* Transmit as Hexadecimal code.)
* [DATA] : To transmit command data. Transmit 'FF' data to read status of command.
* [Cr] : Carriage Return ASCII code '0x0D'
* [ ] : Added to classify command, set ID and DATA.

* [Set ID], [Data] : Input command with 2byte.

*OK Acknowledgement*

| [Command2][ ][Set ID][ ][OK][Data][x] |
|---|

* The Monitor transmits ACK (acknowledgement) based on this format when receiving normal data. At this time, if the data is data read mode, it indicates present status data. If the data is data write mode, it returns the data of the PC computer.

*Error Acknowledgement*

| [Command2][ ][Set ID][ ][NG][Data][x] |
|---|

* The Monitor transmits ACK (acknowledgement) based on this format when receiving abnormal data from non-viable functions or communication errors.

* Data : [01] : illegal code (This command is not supported.)
[02] : not support function (This function doesn't work.)
[03] : wait more time (Try again a few minutes later.)

### 01. Power (Command:p)

► To control Power On/Off of the Monitor.

*Transmission*

| [k][a][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Power Off
1 : Power On

*Acknowledgement*

| [a][ ][Set ID][ ][OK][Data][x] |
|---|

Data 0 : Power Off
1 : Power On

► To show Power On/Off.

*Transmission*

| [k][a][ ][Set ID][ ][FF][Cr] |
|---|

*Acknowledgement*

| [a][ ][Set ID][ ][OK][data][x] |
|---|

Data 0 : Power Off
1 : Power On

* In like manner, if other functions transmit 'FF' data based on this format, Acknowledgement data feed back presents status about each function.

### 02. Input Select (Command:b)

► To select input source for the Monitor.
You can also select an input source using the INPUT SELECT button on the Monitor's remote control.

*Transmission*

| [k][b][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : RGB1 4 : RGB2
1 : Component
2 : Video
3 : S-Video

*Acknowledgement*

| [b][ ][Set ID][ ][OK][Data][x] |
|---|

Data 0 : RGB1 4 : RGB2
1 : Component
2 : Video
3 : S-Video

### 03. Aspect Ratio (Command:c)

► To adjust the screen format.
You can also adjust the screen format using the ARC button on remote control or in the Picture Adj. menu.

*Transmission*

| [k][c][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Wide screen (16:9)
1 : Normal screen (4:3)
2 : Full screen (Zoom)

*Acknowledgement*

| [c][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Wide screen (16:9)
1 : Normal screen (4:3)
2 : Full screen (Zoom)

* Using the PC input, you select either Wide screen(16:9) or Normal screen(4:3).

### 04. Screen Mute (Command:d)

▶ To select screen mute on/off.

*Transmission*

| [k][d][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Screen mute off (Picture on)
1 : Screen mute on (Picture off)

*Acknowledgement*

| [d][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Screen mute off (Picture on)
1 : Screen mute on (Picture off)

### 05. Volume Mute (Command:e)

▶ To control volume mute on/off.
You can also adjust mute using the MUTE button on remote control.

*Transmission*

| [k][e][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Volume mute on (Volume off)
1 : Volume mute off (Volume on)

*Acknowledgement*

| [e][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Volume mute on (Volume off)
1 : Volume mute off (Volume on)

### 06. Volume Control (Command:f)

▶ To adjust volume.
You can also adjust volume with the VOL buttons on remote control.

*Transmission*

| [k][f][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [f][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 07. Contrast (Command:g)

▶ To adjust screen contrast.
You can also adjust contrast in the Picture menu.

*Transmission*

| [k][g][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [g][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 08. Brightness (Command:b)

▶ To adjust screen brightness.
You can also adjust brightness in the Picture menu.

*Transmission*

| [k][h][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [h][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 09. Color (Command:i)

▶ To adjust the screen color.
You can also adjust color in the Picture menu.

*Transmission*

| [k][i][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [i][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 10. Tint (Command:j)

▶ To adjust the screen tint.
You can also adjust tint in the Picture menu.

*Transmission*

| [k][j][ ][Set ID][ ][Data][Cr] |
|---|

Data Red : 0 ~ Green : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [j][ ][Set ID][ ][OK][Data][X] |
|---|

Data Red : 0 ~ Green : 64

### 11. Sharpness (Command:k)

▶ To adjust the screen sharpness.
You can also adjust sharpness in the Picture menu.

*Transmission*

| [k][k][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [k][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 12. OSD Select (Command:I)

► To select OSD (On Screen Display) on/off.

*Transmission*

| [k][I][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : OSD off
1 : OSD on

*Acknowledgement*

| [I][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : OSD off
1 : OSD on

### 13. Remote Control Lock Mode (Command:m)

► To set up the locking function of set remote control.

*Transmission*

| [k][m][ ][Set ID][ ][Data][Cr] |
|---|

*Acknowledgement*

| [m][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : off
1 : on

* This function is setting mode when the remote control is not used.

### 14. PIP Select (Command:n)

► To control PIP (Picture-in-Picture) or twin picture. You can also control PIP/TWIN PICTURE using the pip/twin picture button on remote control or in the Twin/Pip menu.

*Transmission*

| [k][n][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : PIP/ DW off
1 : PIP
2 : Twin picture (DW1)
3 : Twin picture (DW2)

*Acknowledgement*

| [n][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : PIP/ DW off
1 : PIP
2 : Twin picture (DW1)
3 : Twin picture (DW2)

### 15. PIP Size (Command:e)

► To select PIP size.

*Transmission*

| [k][o][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Normal screen (4:3)
1 : Wide screen (16:9)

*Acknowledgement*

| [o][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Normal screen (4:3)
1 : Wide screen (16:9)

### 16. PIP Position (Command:q)

► To select sub picture position for PIP.
You can also adjust the sub picture position using the position button on the remote control or in WINDOW POSITION on the TWIN/PIP menu.

*Transmission*

| [k][q][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Right down on screen
1 : Left down on screen
2 : Left up on screen
3 : Right up on screen

*Acknowledgement*

| [q][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Right down on screen
1 : Left down on screen
2 : Left up on screen
3 : Right up on screen

### 17. Treble (Command:r)

► To adjust the treble.
You can also adjust treble in the Sound menu.

*Transmission*

| [k][r][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [r][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 18. Bass (Command:s)

► To adjust the screen bass.
You can also adjust bass in the Sound menu.

*Transmission*

| [k][s][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [s][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 19. Balance (Command:t)

► To adjust the screen balance.
You can also adjust balance in the Sound menu.

*Transmission*

| [k][t][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [t][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 20. Color Temperature (Command:u)

► To set up with 'normal, cool, warm, user' in the color temperature.

*Transmission*

| [k][u][ ][Set ID][ ][Data][Cr] |
|---|

Data 0 : Normal
1 : Cool
2 : Warm
3 : User

*Acknowledgement*

| [u][ ][Set ID][ ][OK][Data][X] |
|---|

Data 0 : Normal 1 : Cool 2 : Warm 3 : User

### 21. R-Adjust (Command:v)

► To adjust 'R-adjust' in the color temperature.

*Transmission*

| [k][v][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [v][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 22. G-Adjust (Command:w)

► To adjust 'G-adjust' in the color temperature.

*Transmission*

| [k][w][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [k][w][ ][Set ID][ ][Data][Cr][x] |
|---|

Data Min : 0 ~ Max : 64

### 23. B-Adjust (Command:$)

► To adjust 'B-adjust' in the color temperature.

*Transmission*

| [k][$][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 64
* Transmit as Hexadecimal code.

*Acknowledgement*

| [$][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 64

### 24. Sub Picture Input Select (Command:y)

Data 0 : RGB1 4 : RGB2
1 : Component
2 : Video
3 : S-Video

| [k][y][ ][Set ID][ ][Data][Cr] |
|---|

Data Min : 0 ~ Max : 4
* Transmit as Hexadecimal code.

*Acknowledgement*

| [y][ ][Set ID][ ][OK][Data][X] |
|---|

Data Min : 0 ~ Max : 4

## THEORY

This section covers what Liquid Crystals are and how an LCD Display works.

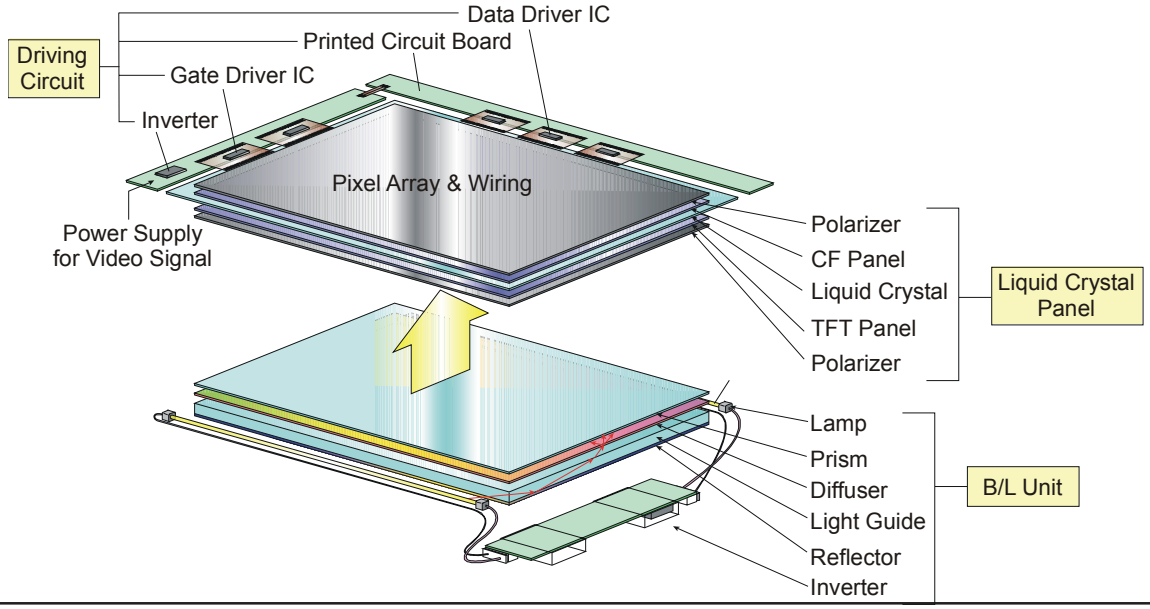
### LIQUID CRYSTALS

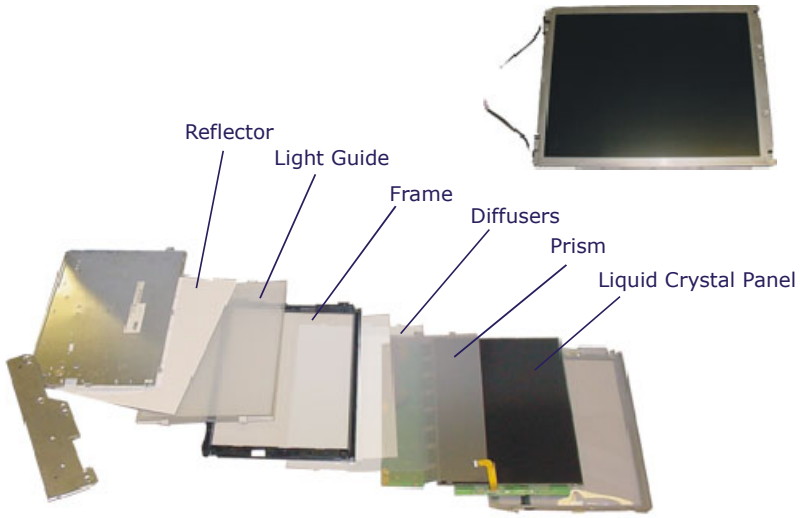
In school you learned that matter has three distinct states; solid, liquid, and gas (and what some consider a fourth state beyond gas, plasma). However, there are states of matter that may fall between these states. Liquid crystals fall somewhere between a liquid and a solid. Basically they are crystals that hold their orientation (shape) but can flow similar to liquids. Their molecules point in the same direction with respect to each other like in a solid, but they are free to change position like a liquid. Think of a handful of pencils. They all point the same direction and hold their shape at rest, but (collectively) change shape when you squeeze or let go of them.


There are different phases and types of liquid crystals that perform differently. Small amounts of pressure, heat, and/or electricity can cause liquid crystals to change in some way. Therefore liquid crystals are used in many different ways, not just for displays. Other uses are thermometers, window coatings, soap, etc. The types of liquid crystals used in LCDs are called Twisted Nematics. As the name implies, they are twisted. By applying an electrical current to them they will untwist.

### LCD DISPLAY

So, how does an LCD actually work? We start with a light source at the back of the panel. Very thin fluorescent bulbs are the light source. This light passes through filters to help create a uniform light source. Then the light passes through the Liquid Crystal Panel. The Liquid Crystal Panel consists of thousands of pixels that control the flow of light throught the panel to make images.

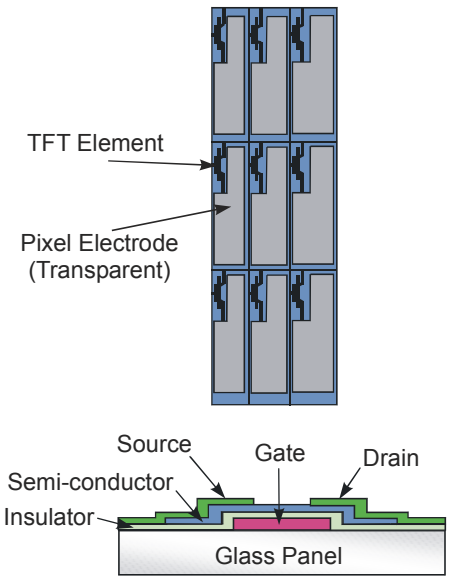


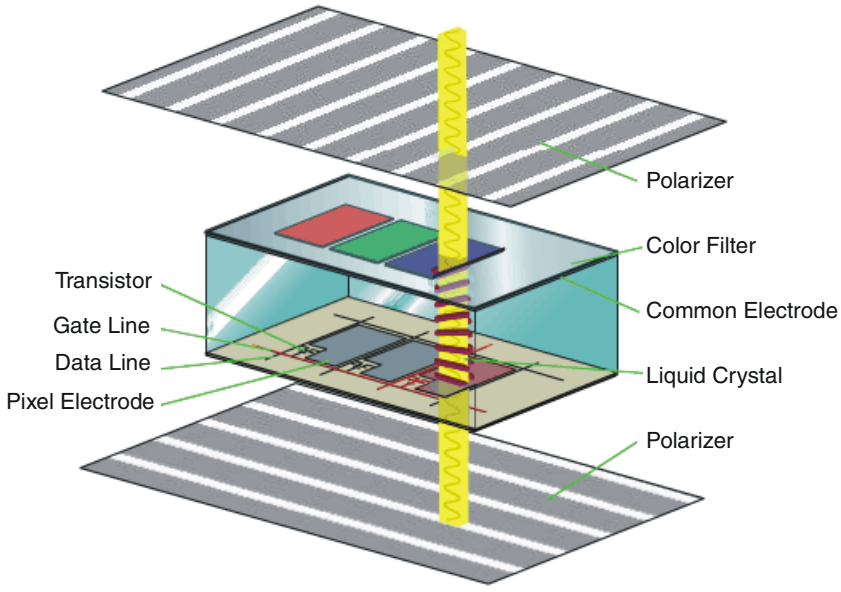



**LCD PANEL**

Below is an exploded view of the Liquid Crystal display panel. The key to an LCD's operation is the polarizers. The polarizers only allow a certain wavelength of light to pass through. The two polarizers are mounted at a 90 degree angle with respect to each other, which prevents light from passing through. The liquid crystals are used to twist the light beam 90 degrees and allow light to pass through that pixel.

Each sub-pixel or cell (a red, green, and blue sub-pixel equals one pixel) is controlled by a Thin Film Transistor (TFT). This provides accurate control of each cell and makes for an accurate picture. Some methods used in the past that didn't involve a switch and current could leak to surrounding cells resulting in a blurred image.



**TERMINOLOGY**

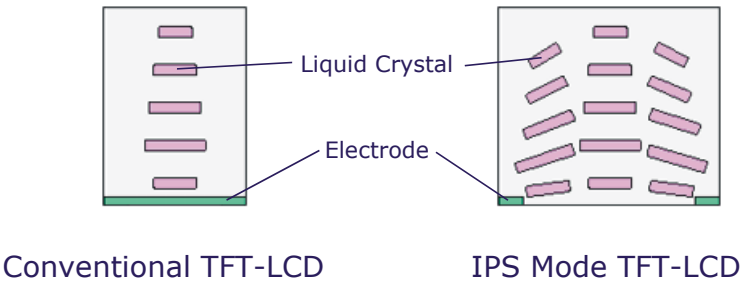
This section explains some of the terminology used with LCD TVs. Viewing angle, IPS (In-Plane Switching), Tuning Standards, Peak Brightness, Contrast Ratio, Response Time, and DVI (Digital Video Interface).

VIEWING ANGLE

Viewing angle is the angle at which the display's brightness begins to noticeably diminish. Viewing angle used to be a major factor when choosing an LCD but they have improved enough on current models that it is not an issue anymore. This is due to advancements like In-Plane Switching, High-efficiency Backlights, and reflective Polarizers. Some smaller screen LCDs (under 15") may still have limited viewing angles to keep costs down.

IPS (IN-PLANE SWITCHING)

In-Plane Switching provides more control over the Liquid Crystals in an LCD. It uses an electric field to line up the Liquid Crystals in an arc formation. This directs light out at angles which improves the viewing angle.




TUNING SYSTEMS

NTSC - National Television System Committee

- Analog
- Capable of 525 lines of resolution
- Supports SDTV only (480i)
- 2 Channel sound

ATSC - Advanced Television Standards Committee

- Supports multiple resolutions

SDTV (480i)

EDTV (480p)

HDTV (480p*, 720p, 1080i)

- 6 Channel sound

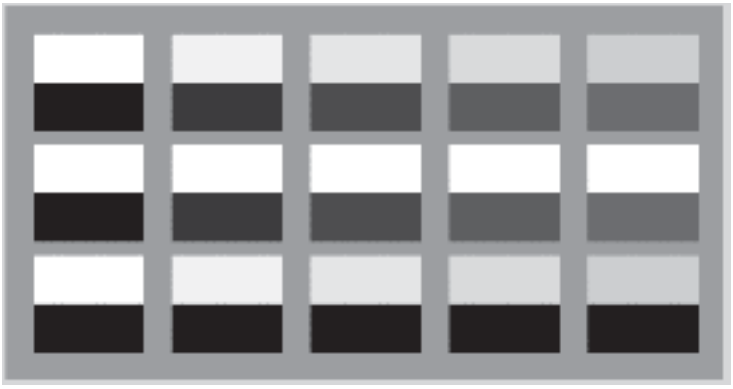
* Technically, 480p is EDTV

PEAK BRIGHTNESS

Peak brightness is the maximum amount of brightness that a display can produce. It is often measured in candella per square meter (cd/m2). Most of our LCDs are 400-450 cd/m2. In comparison, some of our plasma screens are 600 cd/m2.

CONTRAST RATIO

Contrast Ratio is the ratio of a display's brightest white to its darkest black. One of the limitations of LCDs has been contrast ratio. They have improved in the past year but are still less than a CRT or plasma.



RESPONSE TIME

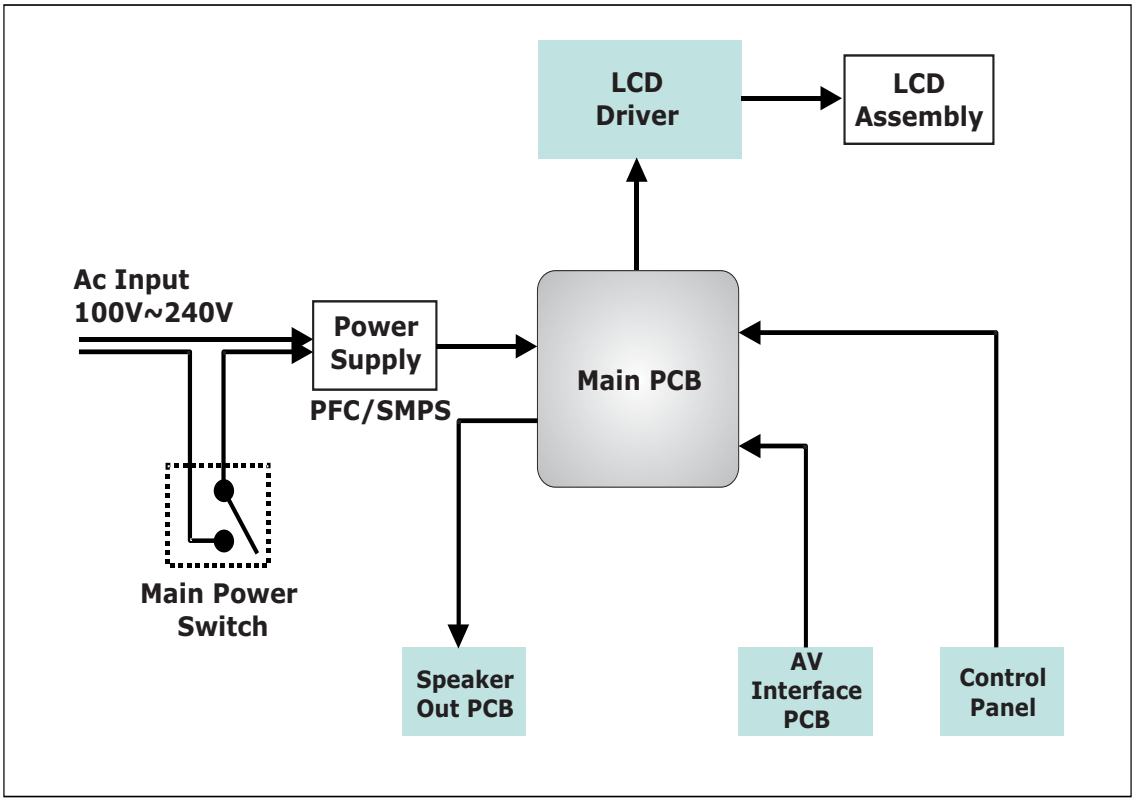
The speed at which the pixels can react or change. Slower response times can cause fast moving video to “ghost” or distort because the scene changes faster than the LCD can display the video (especially with video games). The response time of new LCDs isn't a factor for most uses, but older models can display noticable ghosting due to slower response times.

DVI - Digital Video Interface

DVI is a new digital interface to replace VGA. It supports higher resolutions than VGA and is not as susceptible to interference. There are currently two types of DVI. DVI-I supports both analog and digital signals and DVI-D only supports digital. Our 30” LCD has both a DVI and VGA input. Most smaller screen LCDs will have either a DVI or a VGA connector, not both.

## CIRCUIT DESCRIPTIONS

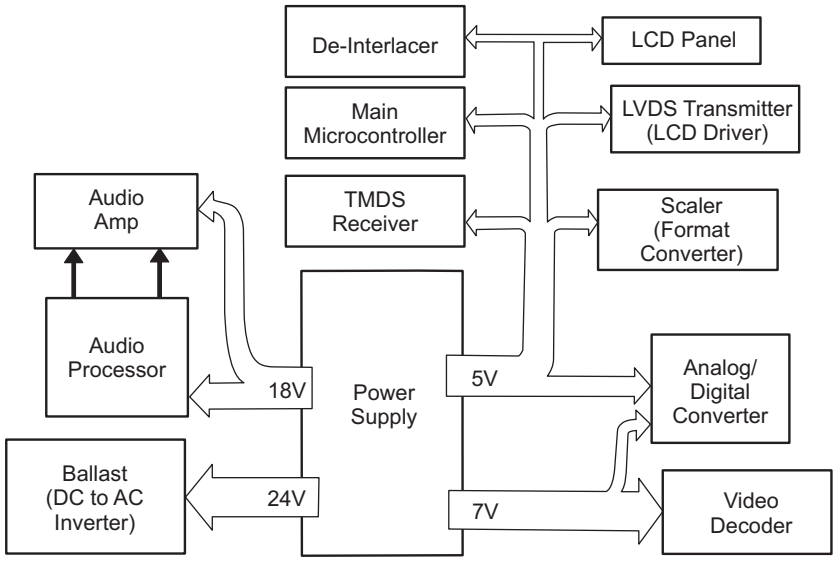
### SYSTEM OVERVIEW




This TV has six separate PCBs; Main, Power Supply, AV interface, Control Panel, Speaker, and the LCD driver board.

### POWER SUPPLY

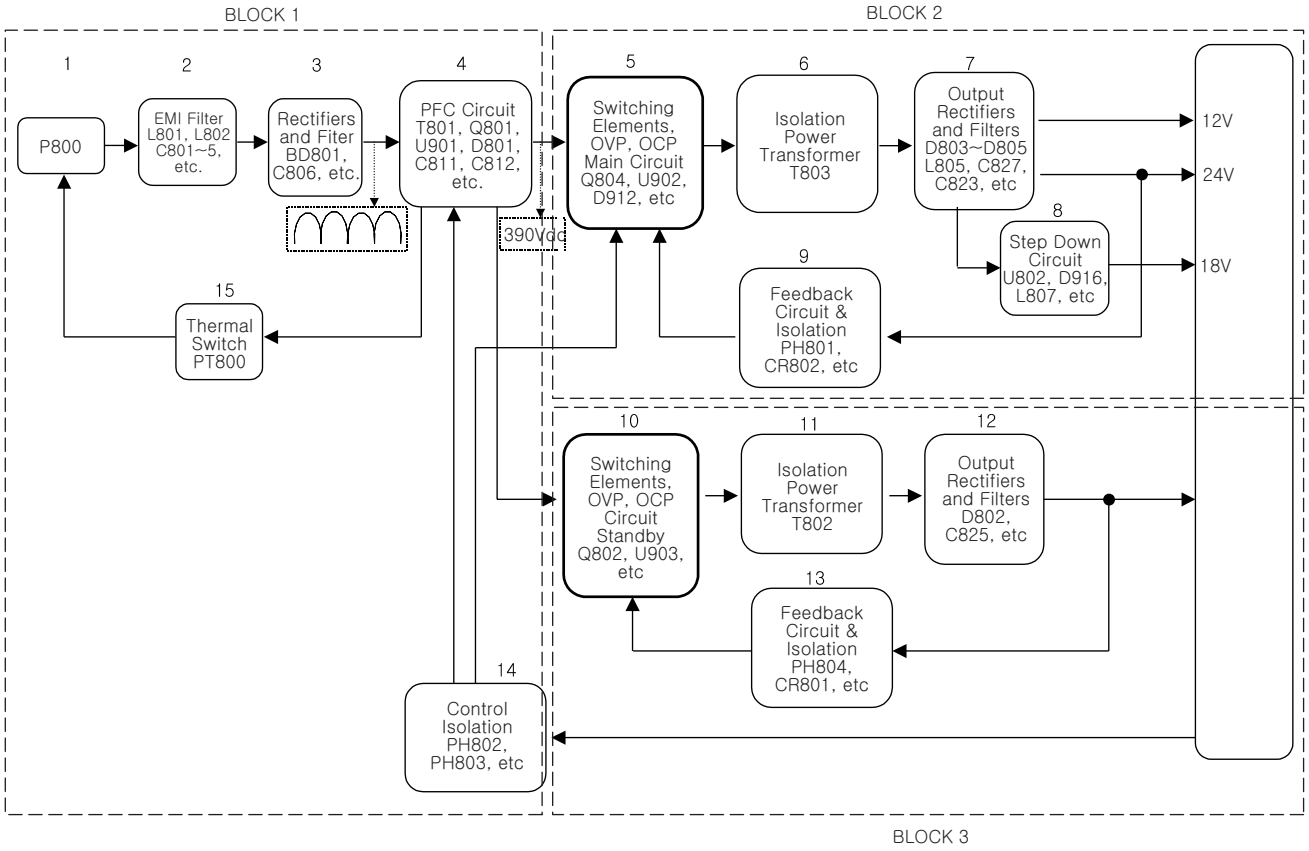
POWER SUPPLY VOLTAGES FLOW CHART



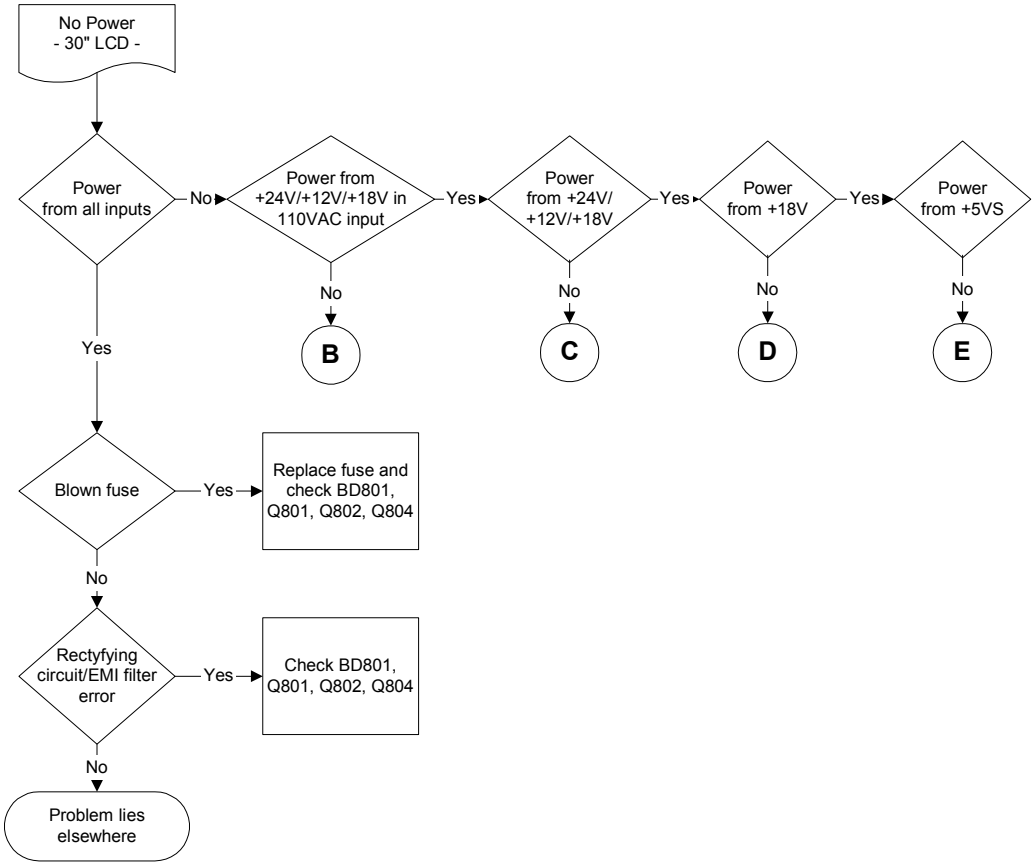
POWER SUPPLY DESCRIPTION

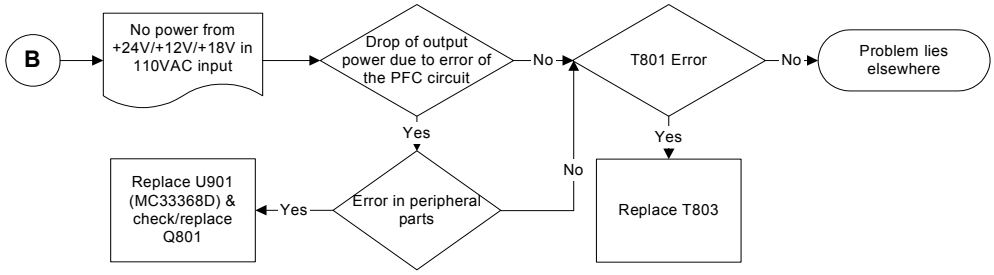
If the AC Input voltage (1) is confirmed, this voltage is adjusted as a DC wave form through the EMI filter (2) and the first rectifier/filter(3). This adjusted wave form is input to PFC circuit (4), Power Factor Correction). The output voltage (+390Vdc) of the PFC circuit becomes a main input voltage of the MAIN (5) and standby switching part (10). Using elements such as the FET and PWM IC, the switching parts (5, 10) convert this high DC voltage (390Vdc) to a spherical wave with a high frequency. To keep the secondary adjusted voltage regular and safe with changing input voltage and output load, the output voltage is monitored and fed back to the switching part through a control circuit (9).

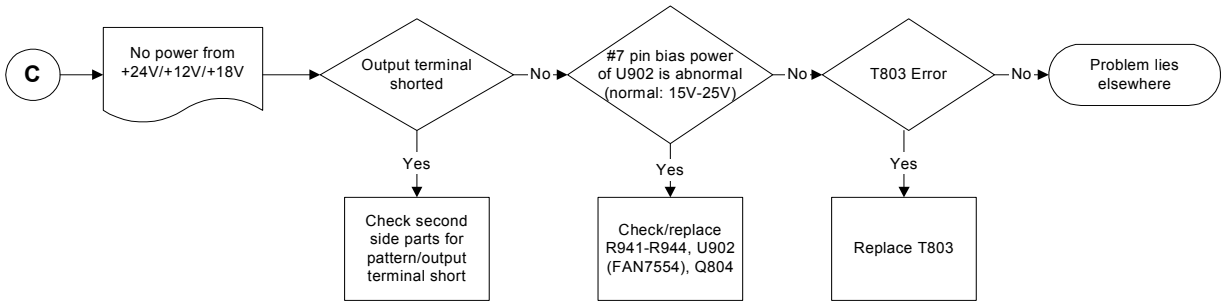
BLOCK 2 works as a forward converter by receiving input from BLOCK 1 and supplying MAIN DC (+24V and +12V) voltage and the step down circuit (8) supplies +18V. BLOCK 3 works as a flyback converter by receiving the input of BLOCK 1 and supplying +5V for standby. A protection circuit is built into the switching part (5, 10) to protect over current, short, or over voltage of the secondary output. When overheating occurs, this circuit protects the output and switches the thermal switch (15) to radiator. The PFC circuit protects against fire or other accidents by turning the AC voltage off. If the OFF signal is transmitted to the PFC circuit (4). Only the +5V circuit for standby works and others are turned off to minimize power consumption.

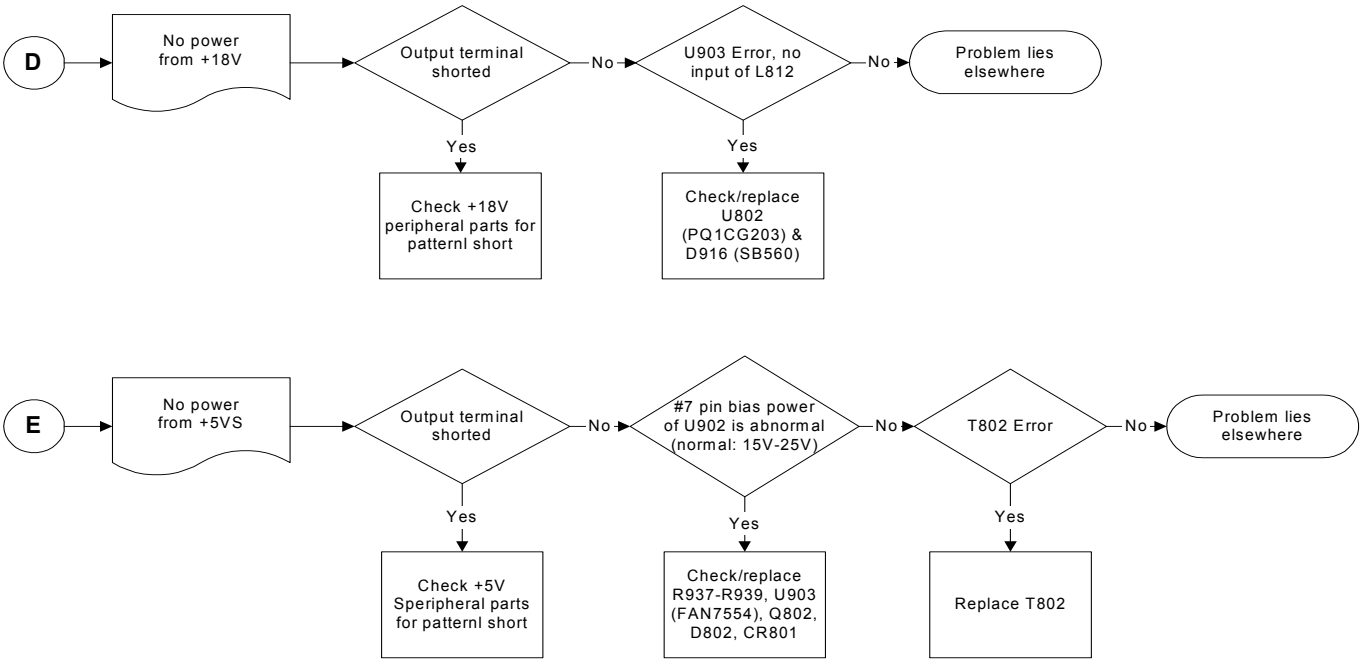


## POWER SUPPLY TROUBLESHOOTING



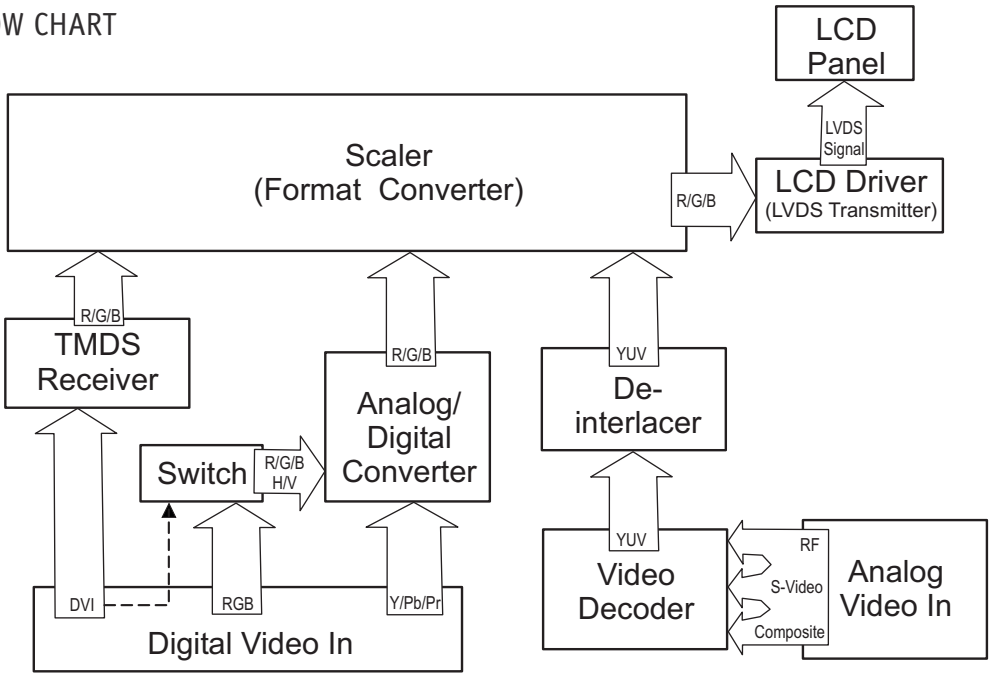



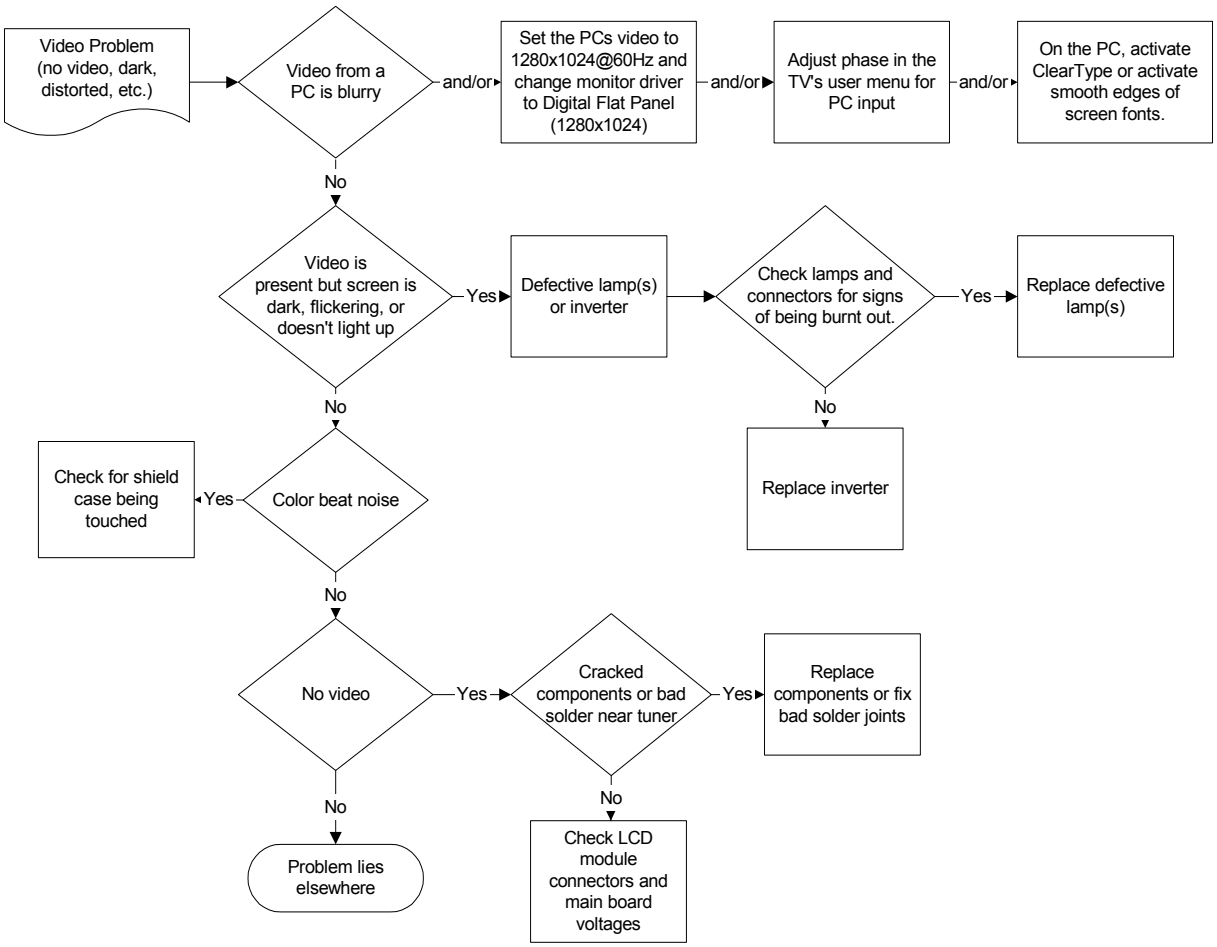

D
No power from +18V
Output terminal shorted
No
U903 Error, no input of L812
No
Problem lies elsewhere
Yes
Check +18V peripheral parts for patternl short
Yes
Check/replace U802 (PQ1CG203) & D916 (SB560)
E
No power from +5VS
Output terminal shorted
No
#7 pin bias power of U902 is abnormal (normal: 15V-25V)
No
T802 Error
No
Problem lies elsewhere
Yes
Check +5V Speripheral parts for patternl short
Yes
Check/replace R937-R939, U903 (FAN7554), Q802, D802, CR801
Yes
Replace T802

**VIDEO**

## VIDEO FLOW CHART

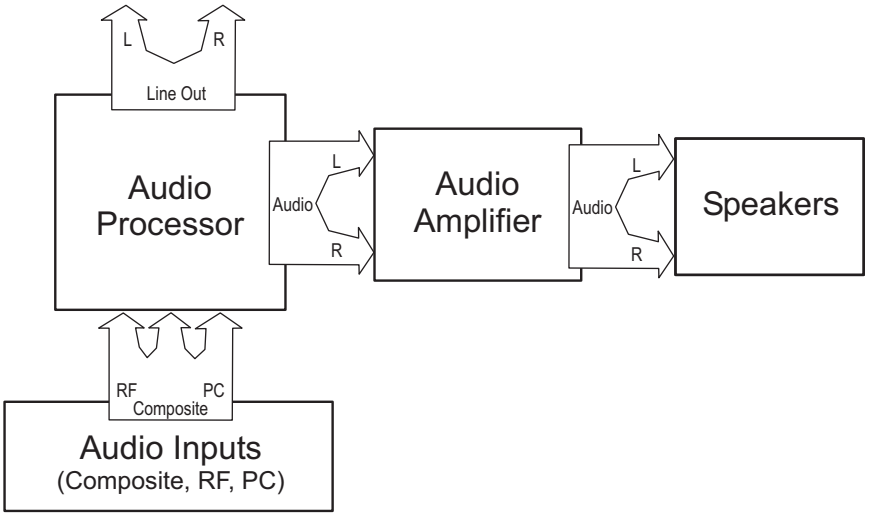



## VIDEO TROUBLESHOOTING

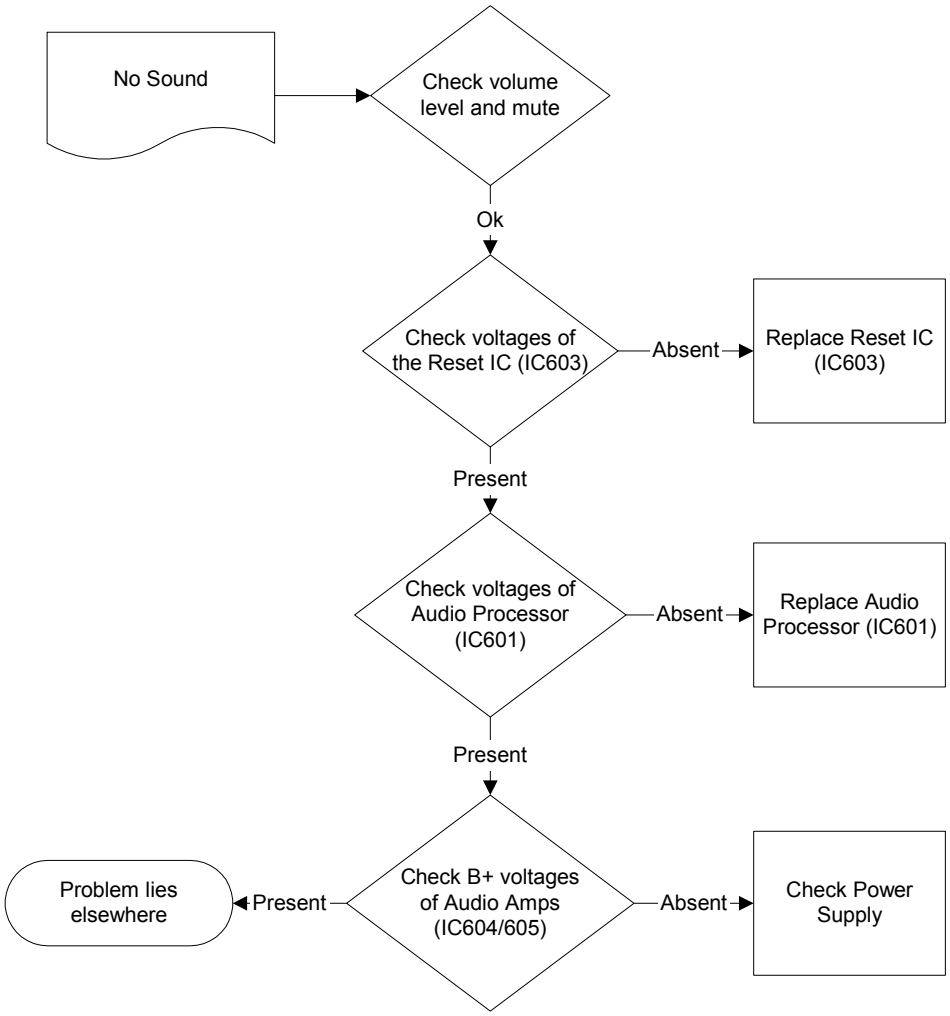


**AUDIO**

## AUDIO FLOW CHART




## AUDIO TROUBLESHOOTING



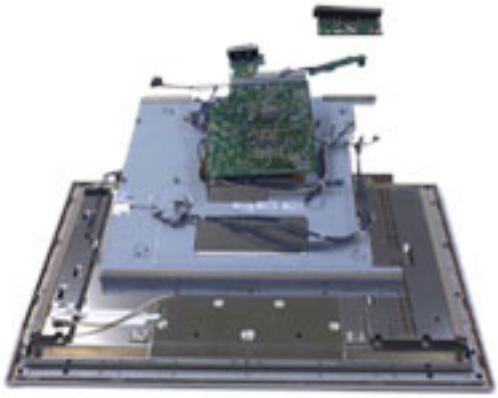
## DISASSEMBLY

The 30" LCD has sixteen lamps which are in pairs lined up behind the screen. To gain access to the lamps, the TV needs to be completely disassembled. To gain access to the two ballast assemblies (inverters), the back cover and PCB frame needs to be removed. Expect our future LCDs that are larger than the 30" to have a similar layout.

1) Remove the cover and the stand.

2) Remove the back cover.

With the back cover removed, individual circuit boards can be removed. To gain access to the lamps, continue with the disassembly, starting with the support assembly. To remove the support assembly, first remove circuit boards that block the assembly's screws.



3) Remove the Speaker and Control panel circuit boards.

4) Remove the Jackpack circuit board.

5) Remove the screws from the NTSC board and lay it over on the Power Supply board (there is no need to disconnect the board). Now, remove the frame.

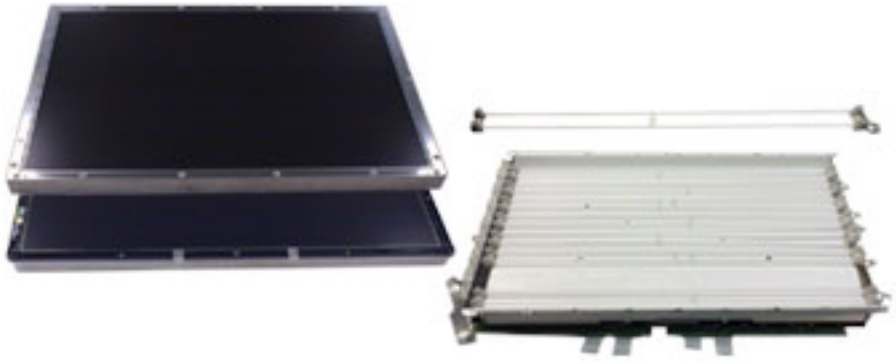
6) Remove the shields from the three remaining circuit boards.

7) Now remove the LCD driver board by removing the cables that have the blue connectors. There is a latch on each of the female connectors that must be lifted before the cable can be removed.

8) Now there is access to both ballast assemblies. Change the defective ballast assembly or continue to step 9 if a lamp is defective and needs to be changed.

9) To gain access to the lamps, turn the panel over and remove the screen.

10) Replace any defective lamps.



## ADJUSTMENT INSTRUCTIONS

**NOTES**

1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of an isolation transformer will help protect test instruments.

2) Adjustments must be done in the correct order.

3) Adjustments must be performed at a temperature of 25±5°C and 65±10% relative humidity.

4) The input voltage of the receiver must be kept at 100-240V, 50/60Hz while adjusting. the power voltage accepted by this chassis is Wide-Range and the input voltage can be from 85V to 260V. But, adjustment should be operated in 100-240V, 50/60Hz if there is no specific designation.

5) The receiver must be operated for about 15 minutes prior to the adjustment with a 100% white pattern (06CH) or white condition in HEAT-RUN mode.

**HEAT-RUN MODE**

Select HEAT RUN OFF by pressing the ADJ button on the service remote. Press the VOL + button in HEAT-RUN OFF and the OSD will display HEAT-RUN WHITE and the screen displays a 100% full WHITE PATTERN. In this mode, the monitor is activated for HEAT-RUN without a signal generator. Single color patterns of the HEAT-RUN mode can also be used to check the PANEL (RED/BLUE/GREEN).

**[Caution]** If you turn on a still screen more than 20 minutes (especially, Digital pattern, Cross Hatch Pattern), an after-image may be occur in the black level part of the screen.

**EDID ADJUSTMENT**

Extended Display Identification Data is the "Plug and Play"feature.

1) EDID DATA for DVI of MF-02HA

EDID table =

00 01 02 03 04 05 06 07 08 09

```
_____________________________________________
000 | 00 FF FF FF FF FF FF 00 1E 6D
010 | D7 3A 01 01 01 01 33 0B 01 01
020 | 81 40 26 96 08 B7 FB A1 56 48
030 | 98 24 13 48 4B AF EF 00 81 00
040 | 31 59 45 59 61 59 81 80 71 4F
050 | 01 01 01 01 BC 34 00 98 51 00
060 | 2A 40 10 90 13 00 40 26 00 00
070 | 00 1E 00 00 00 FC 00 4D 57 20
080 | 33 30 4C 5A 31 30 0A 20 20 20
090 | 00 00 00 FD 00 3C 78 1F 5B 10
100 | 00 0A 20 20 20 20 20 20 D5 09
110 | 80 A0 20 E0 2D 10 10 60 A2 00
120 | EE F0 75 00 00 18 00 BD
```

2) EDID DATA for RGB of MF-02HA

EDID table =

00 01 02 03 04 05 06 07 08 09

```
_____________________________________________
000 | 00 FF FF FF FF FF FF 00 1E 6D
010 | D7 3A 01 01 01 01 33 0B 01 01
020 | 1E 40 26 96 08 B7 FB A1 56 48
030 | 98 24 13 48 4B AF EF 00 81 00
040 | 31 59 45 59 61 59 81 80 71 4F
050 | 01 01 01 01 BC 34 00 98 51 00
060 | 2A 40 10 90 13 00 40 26 00 00
070 | 00 1E 00 00 00 FC 00 4D 57 20
080 | 33 30 4C 5A 31 30 0A 20 20 20
090 | 00 00 00 FD 00 3C 78 1F 5B 10
100 | 00 0A 20 20 20 20 20 20 D5 09
110 | 80 A0 20 E0 2D 10 10 60 A2 00
120 | EE F0 75 00 00 18 00 BD
```

3) Refer to Service Manual related to EDID communication.

**WHITE BALANCE ADJUSTMENT**

1) Required Equipment

Color analyzer (CA-100 or similar model).

2) White Balance Adjustment (Manual Adjustment). Operate Zero Calibration of CA-100 and Sensor must be stuck to the surface of LCD module. Manual adjustment into AV/PC and operate adjustment by the following sequence.

AV W/B ADJUSTMENT

1) Select WHITE PATTERN of HEAT RUN mode by pressing ADJ button on remote control for adjustment then operate HEAT RUN more than 15 minutes.

2) Supply pattern signal for WB adjustment in pattern generator. (AV INPUT)

3) Low Light has no special adjustment.

4) To adjust High Light, stick sensor to 2nd pattern (White), select and adjust the AV GAIN by pressing INSTSRT button on remote control for adjustment.

After selecting the R GAIN and G GAIN, enter the Adjustment Mode by pressing the ENTER button and press the VOL +/-. Key and adjust it until color coordination becomes (B GAIN is fixed) color coordination: X=0.283±0.003, Y=0.296±0.003 color temperature : 9,350°K ± 500°K.

5) Exit adjustment mode using Enter button.

PC W/B ADJUSTMENT

1) Select WHITE PATTERN of HEAT RUN mode by pressing ADJ button on remote control for adjustment then operate HEAT RUN more than 15 minute.

2) Supply pattern signal for WB adjustment from the pattern generator (RGB1 INPUT).

3) Low Light has no special adjustment.

4) To adjust High Light, stick sensor to 2nd pattern (White), select and adjust the PC GAIN by pressing the INSTART button on the remote control for adjustment.

After selecting R GAIN or G GAIN, enter Adjustment Mode by pressing the ENTER button and press the VOL +/- to make the adjustment. Use the RGB Signal Input on the LCD monitor. Set the high light to 450±70cd/m2. B GAIN is fixed, adjust R GAIN and G GAIN for :X=0.283±0.003, Y=0.296±0.003, color temperature of 9,350°K ± 500°K.

R Gain is used to adjust X-coordinates while adjusting, X-coordinates could be shortened when R Gain is increased. G Gain is used to adjust Y-coordinates while adjusting, Y-coordinates could be shortened when G Gain is increased.

5) Exit adjustment mode using the ENTER button.

COMPONENT OFFSET ADJUSTMENT

This adjustment is used to remove the declination of YPbPr Offset.

1) Operate the adjustment after PC/AV White Balance adjustment progress.

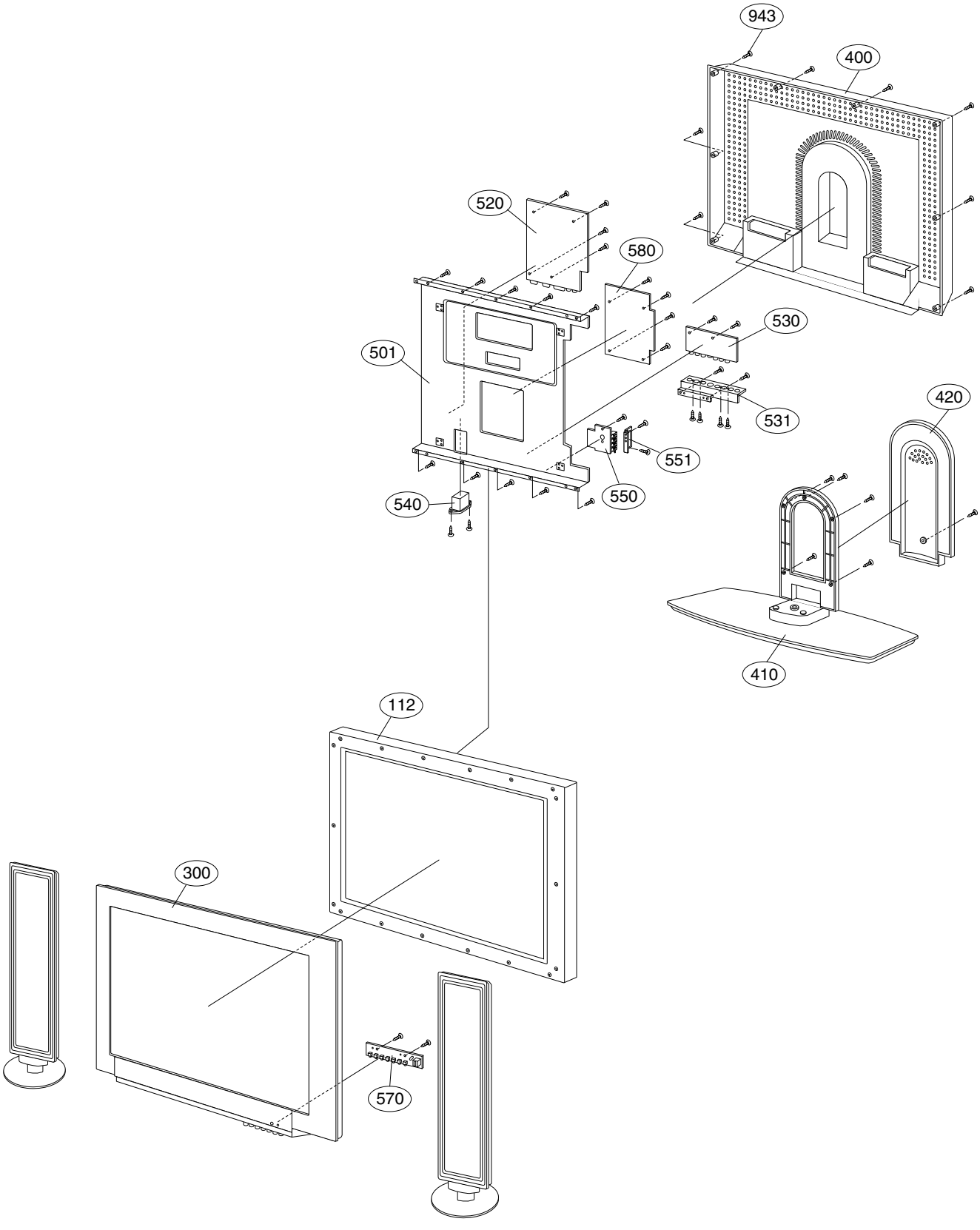
2) Select Ch.14 after connecting DTV STB to Component (480p~1080i) terminal and AV terminal.

3) When you press ADJ button twice on the service remote, the SET goes to DWI condition and Main Window (right side)/Sub Window(left side) are set to AV mode.

4) In this condition, adjust R with 'DTV R OFFSET' and B with 'DTV B OFFSET' based on 'foundation color(Gray)'.

5) Exit adjustment mode using the ENTER button.

## DIAGRAMS

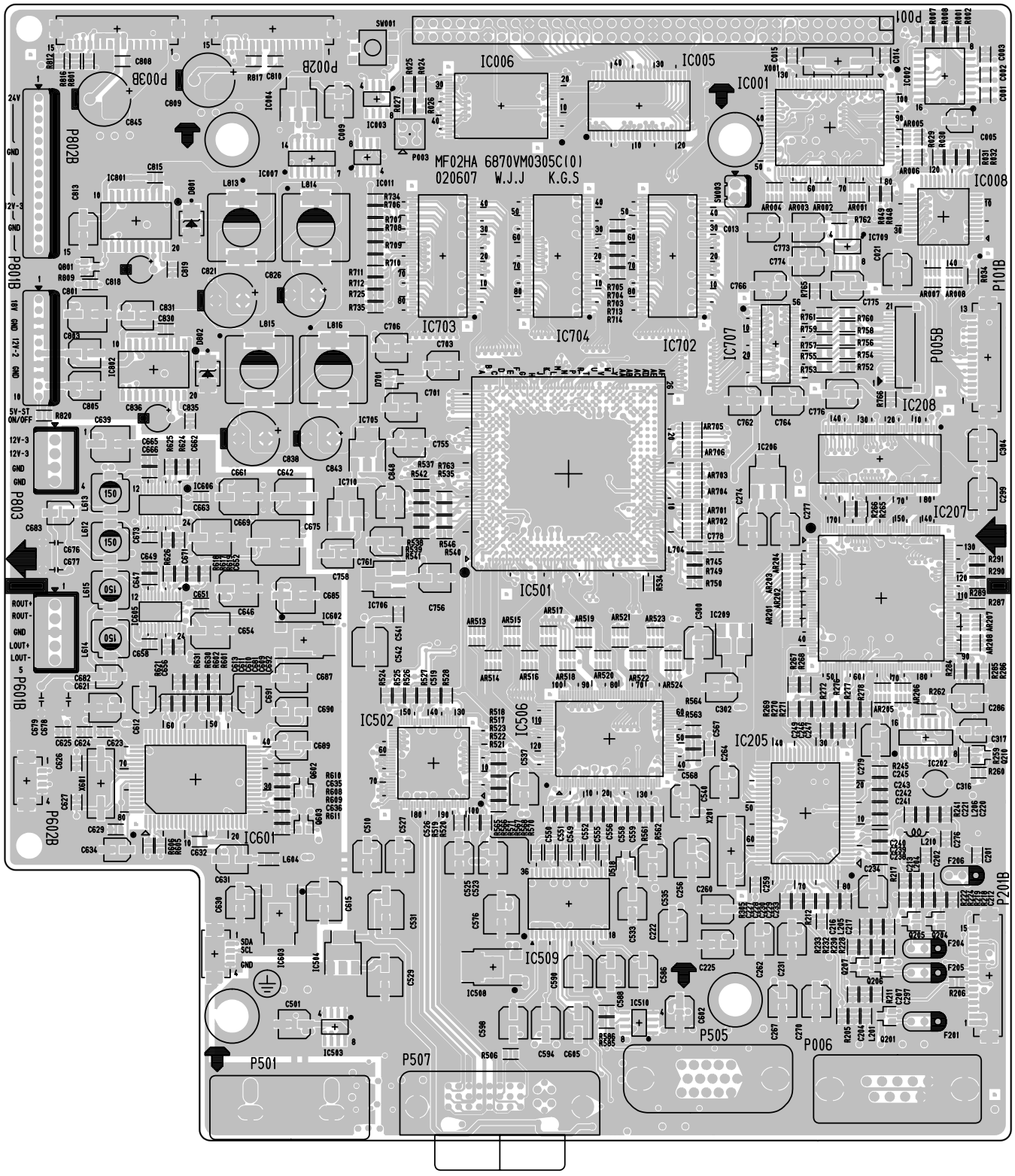


# EXPLODED VIEW PARTS LIST

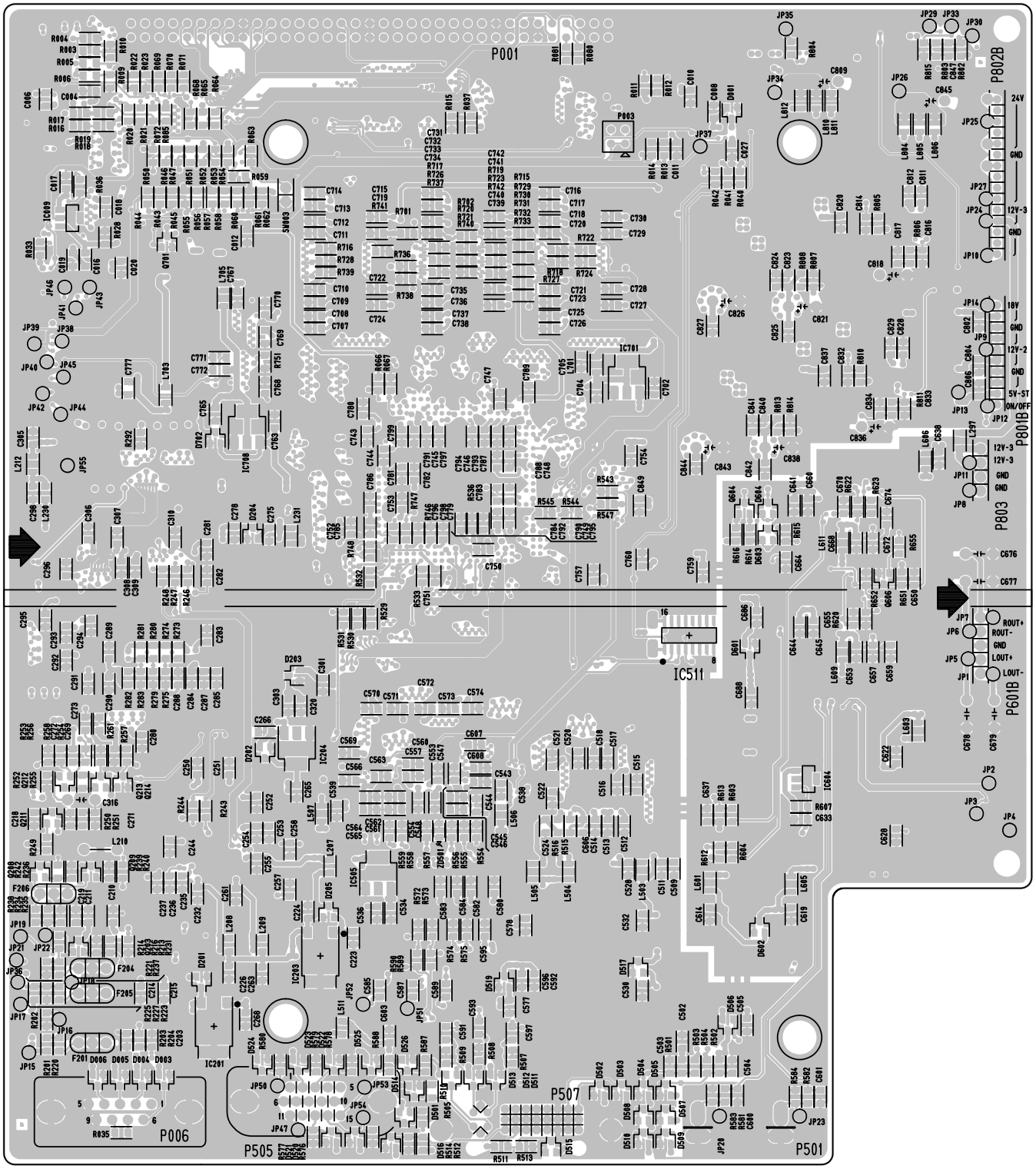
| No. | PART NO. | DESCRIPTION |
|---|---|---|
| 112 | 6305V00001A | LCD ASSEMBLY,30” LCD PANEL LC30W01-A3 AND I |
| 300 | 3091V00A73B | CABINET ASSEMBLY |
| 400 | 3809V00A33B | BACK COVER ASSEMBLY |
| 410 | 3501V00083A | BOARD ASSEMBLY,BASE MW-30LZ10 |
| 420 | 3508V00306A | DECO,REAR COVER |
| 501 | 4980V00505B | SUPPORTER ASSY,MODULE |
| 520 | 6871VMN648A | PCB ASSEMBLY,MAIN MF-02HA MW-30LZ10 MAIN BO |
| 530 | 6871VSN182B | PCB ASSEMBLY,SUB A/V MF-02HA MW-30LZ10 AV BOARD |
| 531 | 4930V00226E | HOLDER,AV |
| 540 | 3141VPN048A | CHASSIS ASSEMBLY,SMPS MF-02HA LCD30 SWITCH |
| 550 | 6871VSN181A | PCB ASSEMBLY,SUB SPK MF-02HA MW-30LZ10 SPK BOAR |
| 551 | 4930V00224C | HOLDER,SPK JACK |
| 560 | 6633VA0004A | INVERTER ASSEMBLY,24VOLT 1100VOLT K.S. KLS300W1 |
| 570 | 6871VSN180A | PCB ASSEMBLY,SUB CONT MF-02HA MW-30LZ10 CONTROL |
| 580 | 3501V00091A | BOARD ASSEMBLY,SMPS PFC MW-30LZ10 MF-02HA LCD |
| 943 | 1FBF0403122 | SCREW,D4.0 L16.0 |

**PCB DIAGRAMS**

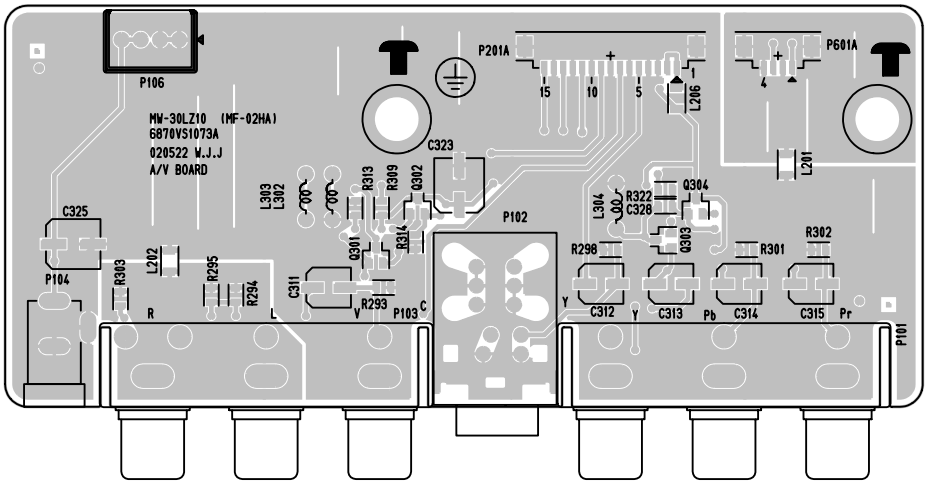
## MAIN(TOP)



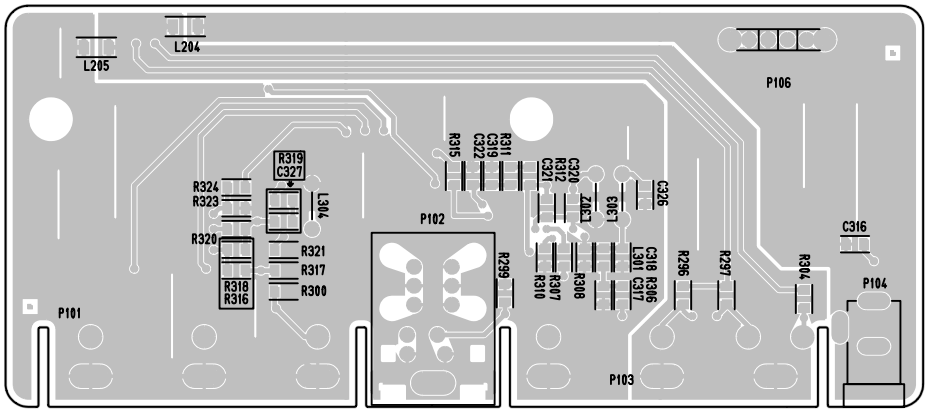
## MAIN(BOTTOM)


P001
P003
IC511
IC201
P006
P505
P507
P501
P802B
P801B
P803
P601B
24V
GND
12V-3
18V
12V-2
5V-ST
ON/OFF
ROUT+
ROUT-
LOUT+
LOUT-

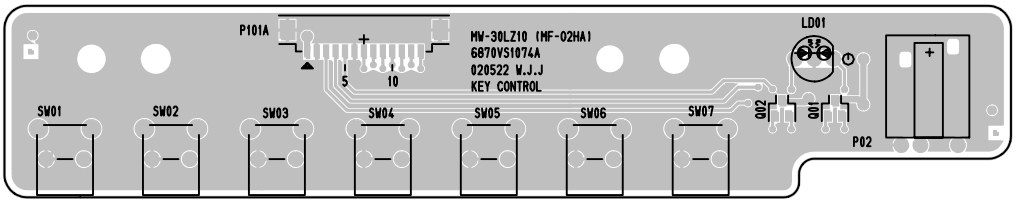
## SIDE A/V(TOP)



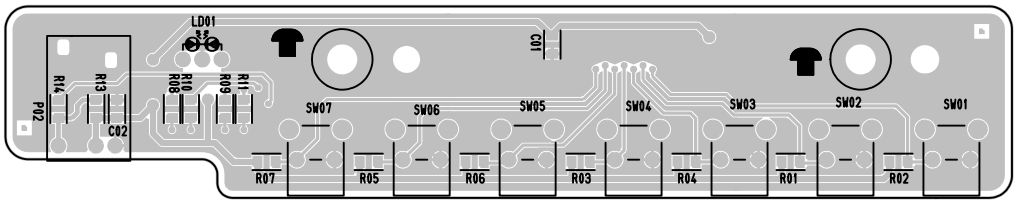

## SIDE A/V(BOTTOM)



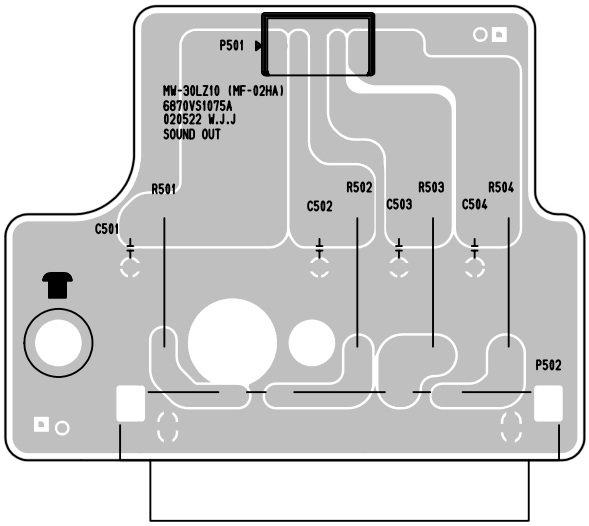
## CONTROL(TOP)



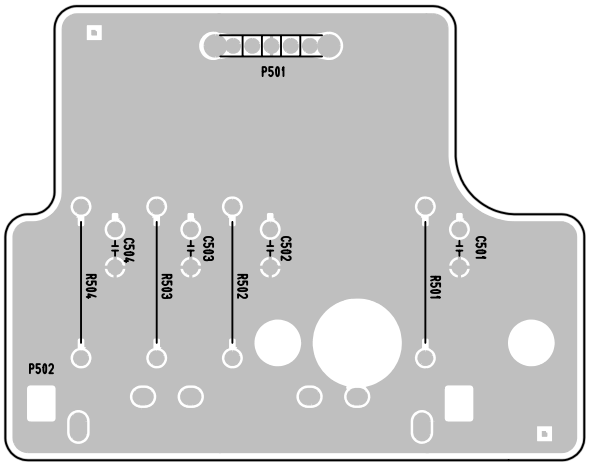

## CONTROL(BOTTOM)




## POWER(TOP)




## POWER(BOTTOM)



## PARTS

RUN DATE : 2002.8.24

| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| | **IC** | |
| IC001 | 0IMCRRS001A | R8820LV RDC SEMICONDUCTOR LTD |
| IC002 | 0IDS232000A | DS232AS 16P,SOP TP RS-232 DRIV |
| IC003 | 0IDS170800A | DS1708S 8P SOIC ST MICROMONITO |
| IC004 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC005 | 0IMMRSS064A | K6R4016V1C-TC10 SAMSUNG ELECTR |
| IC006 | 0IMMRMR006A | MX29LV160TTC-70 MACRONIX 48P T |
| IC007 | 0IPH748600D | 74HC86 SOIC-14 TP QUAD 2-INPUT |
| IC008 | 0IOK825522A | MSM82C55A-2GS-2K 44P QFP ST CM |
| IC009 | 0IKE704200J | KIA7042AF SOT-89 TP 4.2V VOLTA |
| IC011 | 0IAL241610A | AT24C16N-10SI 8P SOIC ST EEPRO |
| IC201 | 0IMCRFA008A | KA78M05RTM, FAIRCHILD 2P D-PAK |
| IC202 | 0IFA741230A | DM74LS123MX 16SOP TP DUAL RETR |
| IC203 | 0IMCRFA008A | KA78M05RTM, FAIRCHILD 2P D-PAK |
| IC204 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC205 | 0IIT323000E | VPC3230D C5 80P QFP |
| IC206 | 0IPRPML001A | MIC39100 MICREL 3P SOT223 R/TP |
| IC207 | 0IMCRG2001A | FLI2200 SAGE 176P,QFP TRAY VID |
| IC208 | 0ISS464323A | K4S643232E(C)-TC/L60(70) (KM43 |
| IC209 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC501 | 0IMCROT001A | REMBRANT-1A OPLUS TECHNOLOGIES |
| IC502 | 0IMCRS5002A | SIL161BCT RX SILICON IMAGE 100 |
| IC503 | 0IAL242110A | AT24C21-10SI-2.5 8P,SOP TP 1K |
| IC504 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC505 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC506 | 0IMCRAD003A | AD9888KS-140 ANALOG DEVICE 128 |
| IC508 | 0IMCRFA008A | KA78M05RTM, FAIRCHILD 2P D-PAK |
| IC509 | 0IMCRMI006A | M52758FP MITSUBISHI 36PIN, R/T |
| IC510 | 0IAL242110A | AT24C21-10SI-2.5 8P,SOP TP 1K |
| IC511 | 0IMCRTI001A | SN74HCT157D TEXAS INSTRUMENT 1 |
| IC601 | 0IMCRMN011D | MSP3410G QA B8 V3 MICRONAS 80P |
| IC602 | 0IMCRFA009A | KA78M08RTM, FAIRCHILD 2P D-PAK |
| IC603 | 0IMCRFA008A | KA78M05RTM, FAIRCHILD 2P D-PAK |
| IC604 | 0IKE704200J | KIA7042AF SOT-89 TP 4.2V VOLTA |
| IC605 | 0IMCRTI015A | TPA3000D1 TEXAS INSTRUMENT 24P |
| IC606 | 0IMCRTI015A | TPA3000D1 TEXAS INSTRUMENT 24P |
| IC701 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC702 | 0ISS464323A | K4S643232E(C)-TC/L60(70) (KM43 |
| IC703 | 0ISS464323A | K4S643232E(C)-TC/L60(70) (KM43 |
| IC704 | 0ISS464323A | K4S643232E(C)-TC/L60(70) (KM43 |
| IC705 | 0IMCRSJ001A | SC1565IST-1.8 SEMTECH 3P SOT22 |
| IC706 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC707 | 0IMCRTH001A | THC63LVDM83R THINE ELECTRONICS |
| IC708 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC710 | 0ISJ111733A | EZ1117CST-3.3 3P,SOT-223 TP 3. |
| IC801 | 0IMCRSG003A | L4973D5.1 SGS-THOMSON 20P SOP |

| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| IC802 | 0IMCRSG003A | L4973D5.1 SGS-THOMSON 20P SOP |
| | **TRANSISTOR** | |
| IC709 | 0TF492509AA | FET,SI4925DY TP TEMIC 30V 6.1A SO |
| Q01 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q02 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q201 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q203 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q204 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q205 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q206 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q207 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q208 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q209 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q210 | 0TR102009AG | CHIP KRC102S SOT-23 TP KEC |
| Q211 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q212 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q213 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q214 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q301 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q302 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q303 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q304 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q602 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q603 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q604 | 0TR150400BA | CHIP 2SA1504S(ASY) KEC |
| Q606 | 0TR387500AA | CHIP 2SC3875S(ALY) KEC |
| Q701 | 0TR102009AG | CHIP KRC102S SOT-23 TP KEC |
| Q801 | 0TR102009AG | CHIP KRC102S SOT-23 TP KEC |
| | **DIODE** | |
| D001 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D003 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D004 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D005 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D006 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D201 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D202 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D203 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D204 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D205 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D501 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D502 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D503 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D504 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D505 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D506 | 0DD184009AA | KDS184S CHIP 85V 300MA KEC TP |
| D507 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D508 | 0DD226239AA | CHIP KDS226 SOT-23 |

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CQ : Polyestor
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| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| D509 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D510 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D511 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D512 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D513 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D514 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D515 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D516 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D517 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D518 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D519 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D520 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D521 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D522 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D523 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D524 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D525 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D526 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D601 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D602 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D603 | 0DD181009AB | KDS181 TP KEC - 85V - - - 300M |
| D604 | 0DD181009AB | KDS181 TP KEC - 85V - - - 300M |
| D701 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D702 | 0DD226239AA | CHIP KDS226 SOT-23 |
| D801 | 0DR190309AA | MBRS190T3 TP MOTOROLA - 90V 1A |
| D802 | 0DR190309AA | MBRS190T3 TP MOTOROLA - 90V 1A |
| LD01 | 0DL200000CA | LED,SAM5670(DL-2LRG) BK Y-GREEN - |
| ZD501 | 0DZRM00178A | ZENERS,UDZS TE-17 5.1B |
| | **CAPACITOR** | |
| C005 | 0CE106SF6DC | 10UF MVG 16V 20% R/TP(SMD) SMD |
| C009 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C013 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C016 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C021 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C222 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C225 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C231 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C234 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C238 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C239 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C240 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C241 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C256 | 0CE107SF6DC | 100UF MVG 16V M SMD R/TP |
| C260 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C262 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C264 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C267 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C270 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C274 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C277 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C279 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |

| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| C286 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C299 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C300 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C302 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C304 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C311 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C312 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C313 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C314 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C315 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C316 | 181-064P | 10UF 0 16V K CA TP 5 |
| C317 | 0CE106SF6DC | 10UF MVG 16V 20% R/TP(SMD) SMD |
| C323 | 0CE107VF6DC | 100UF MV 16V 20% R/TP(SMD) SMD |
| C325 | 0CE107VF6DC | 100UF MV 16V 20% R/TP(SMD) SMD |
| C501 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C510 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C523 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C525 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C527 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C529 | 0CE107SF6DC | 100UF MVG 16V M SMD R/TP |
| C531 | 0CE107SF6DC | 100UF MVG 16V M SMD R/TP |
| C533 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C535 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C537 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C540 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C542 | 0CE107SF6DC | 100UF MVG 16V M SMD R/TP |
| C576 | 0CE107SF6DC | 100UF MVG 16V M SMD R/TP |
| C586 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C588 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C590 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C594 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C598 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C602 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C605 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C612 | 0CE106SF6DC | 10UF MVG 16V 20% R/TP(SMD) SMD |
| C615 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C621 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C630 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C631 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C634 | 0CE106SF6DC | 10UF MVG 16V 20% R/TP(SMD) SMD |
| C639 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C642 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C646 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C654 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C661 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C669 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C676 | 181-007F | MPE ECQ-V1H224JL3(TR), 50V 0.2 |
| C677 | 181-007F | MPE ECQ-V1H224JL3(TR), 50V 0.2 |
| C678 | 181-007F | MPE ECQ-V1H224JL3(TR), 50V 0.2 |
| C679 | 181-007F | MPE ECQ-V1H224JL3(TR), 50V 0.2 |
| C682 | 0CE105SK6DC | 1UF MVG 50V M SMD R/TP |
| C683 | 0CE105SK6DC | 1UF MVG 50V M SMD R/TP |

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| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| C685 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C687 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C689 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C690 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C691 | 0CE335SK6DC | 3.3UF MVG 50V 20% SMD R/TP |
| C701 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C703 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C706 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C755 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C756 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C758 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C761 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C762 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C764 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C766 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C773 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C774 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C775 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C776 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C801 | 0CE476VH6DC | 47UF MV 25V 20% R/TP(SMD) SMD |
| C803 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C805 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C809 | 0CE477BJ618 | 470UF KME TYPE 35V 20% FL TP 5 |
| C813 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C815 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C818 | 0CE106BF618 | 10UF KME 16V M FL TP5 |
| C821 | 0CE108DD618 | 1000UF STD 10V M FL TP5 |
| C826 | 0CE477DD618 | 470UF STD 10V M FL TP5 |
| C830 | 0CK224DF56A | 220000PF 2012 16V 10% R/TP X7R |
| C831 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| C836 | 0CE106BF618 | 10UF KME 16V M FL TP5 |
| C838 | 0CE108DD618 | 1000UF STD 10V M FL TP5 |
| C843 | 0CE477DD618 | 470UF STD 10V M FL TP5 |
| C845 | 0CE477BJ618 | 470UF KME TYPE 35V 20% FL TP 5 |
| C848 | 0CE476SF6DC | 47UF MVG 16V M SMD R/TP |
| **COIL & TRANSFORMER** | | |
| L210 | 0LA0101K119 | INDUCTOR,1.0UH K |
| L302 | 0LA0472K119 | INDUCTOR,47UH K |
| L303 | 0LA0101K119 | INDUCTOR,1.0UH K |
| L304 | 0LA0102K119 | INDUCTOR,10UH K |
| L612 | 6140VR0005A | COIL,SLF7045T-150M1R1 TDK 15UF |
| L613 | 6140VR0005A | COIL,SLF7045T-150M1R1 TDK 15UF |
| L614 | 6140VR0005A | COIL,SLF7045T-150M1R1 TDK 15UF |
| L615 | 6140VR0005A | COIL,SLF7045T-150M1R1 TDK 15UF |
| L813 | 6140VR0001C | COIL,SB1260-470 GET 47UH |
| L814 | 6140VR0001C | COIL,SB1260-470 GET 47UH |
| L815 | 6140VR0001C | COIL,SB1260-470 GET 47UH |
| L816 | 6140VR0001C | COIL,SB1260-470 GET 47UH |
| **JACK** | | |
| P101 | 6612J00010A | JACK,RCA PPJ128A-1 A/V 2P MONO |
| P102 | 380-363K | JACK,DIN PJ6046G H=8.0 W/O S/W |
| P103 | 6612J00010B | JACK,RCA PPJ128A-2 A/V 3P WITH |
| P104 | 6612TAH002A | JACK,PHONE DC-001 UNITOP DC-001 |
| P501 | 6612VJH018A | JACK,RCA PJ6058C-A A/V 2P MON |
| P502 | 6612JH003EA | JACK,RCA UST-AG-013 UGCOM 2P SPK TERMIN |
| P507 | 6612BBBHN6A | JACK,DIN 440062-1 AMP DVI INTERACED |
| **RESISTOR** | | |
| AR001 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR002 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR003 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR004 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR005 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR006 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR007 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR008 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR201 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR202 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR203 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR204 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR205 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR206 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR207 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR208 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR513 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR514 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR515 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR516 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR517 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR518 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR519 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR520 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR521 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR522 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR523 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR524 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR701 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR702 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR703 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR704 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR705 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| AR706 | 0RRZVTA001D | 22 OHM 1 / 16 W 1608 5% |
| R501 | 0RF0111K607 | 1.1 OHM 2 W 5.00% |
| R502 | 0RF0111K607 | 1.1 OHM 2 W 5.00% |
| R503 | 0RF0111K607 | 1.1 OHM 2 W 5.00% |
| R504 | 0RF0111K607 | 1.1 OHM 2 W 5.00% |
| **SWITCH** | | |
| SW01 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| SW001 | 6600VR1004A | SWITCH,TACT SKHMPW 5P CHIP TACT NON |
| SW02 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| SW03 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |

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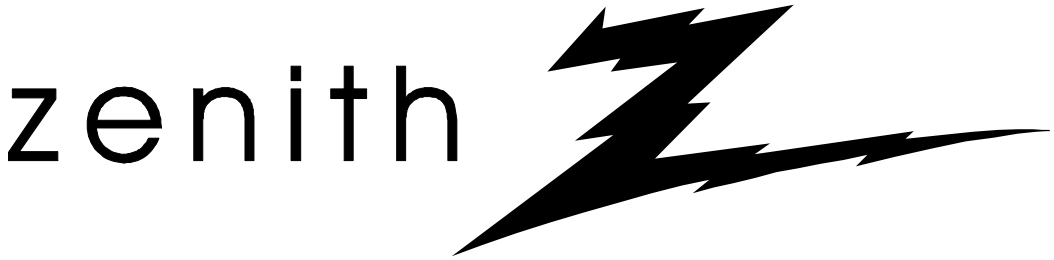
| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| SW04 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| SW05 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| SW06 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| SW07 | 140-315A | SWITCH,TACT SKHV17910B NON 12V |
| **FILTER & CRYSTAL** | | |
| F201 | 166-F01D | FILTER,EMC DSN6NC51H271Q93A |
| F204 | 166-F01D | FILTER,EMC DSN6NC51H271Q93A |
| F205 | 166-F01D | FILTER,EMC DSN6NC51H271Q93A |
| F206 | 166-F01D | FILTER,EMC DSN6NC51H271Q93A |
| L206 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L207 | 6210TCT002B | FILTER,EMC ACB2012M-300-T |
| L208 | 6210TCT002B | FILTER,EMC ACB2012M-300-T |
| L209 | 6210TCT002B | FILTER,EMC ACB2012M-300-T |
| L212 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L231 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L503 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L504 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L505 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L506 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L507 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L511 | 6210VC0005A | FILTER,EMC BK2125 HS 750 |
| L601 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L603 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L604 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L605 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L609 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L611 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L701 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L703 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L704 | 6210TCE001A | FILTER,EMC HB-1S2012-080JT |
| L705 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L804 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L805 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L806 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L810 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L811 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| L812 | 6210TCE001G | FILTER,EMC HH-1M3216-501 |
| X001 | 6212AB2015C | RESONATOR,CRYSTAL HC-49/SM4H 25MHZ +/- 50 |
| X201 | 6202VDT002E | RESONATOR,CRYSTAL SX-1SMD 20250000H |
| X601 | 6202VDT002H | RESONATOR,CRYSTAL SX-1 18.432MHZ |
| **MISCELLANEOUS** | | |
| P02 | 6726VH0001A | REMOTE CONTROLLER RECEIVER,38KHZ |
| P006 | 6630VGA004B | CONNECTOR,D-SUB 9P 2.77MM FOR |
| P505 | 6630VGA001C | CONNECTOR,D-SUB 15PIN 2.29MM |
| **ACCESSORIES** | | |
| A1 | 3828VA0338J | MANUAL,OWNERS MF02HA MW-30LZ10 ZENITH |
| A2 | 6710V00092T | REMOTE CONTROLLER,MF-02HA W/O TXT |
| A3 | 6410VUH003A | POWER CORD,PS204-001 VOLEX UL/C |
| A4 | 174-208D | CORD,A/V(3P,3.0M) |

| LOCA. NO | PART NO | DESCRIPTION |
|---|---|---|
| A5 | 6850V00001A | CABLE,FLAT 1566075-1 DVI A/D TO A/D 2000M |
| A6 | 6851V00001F | CABLE ASSEMBLY,3M RCA-PLUG(2P) TO STEREO 118 |
| A7 | 6866VA9001A | CONNECTOR,2990-9C,AT,L1830,COOL GRAY 3C |


zenith